trends analysis

Washington's Transportation Future is everyone's. Our transportation system serves us 24 hours a day. People drive, ride and carry freight on it. Washington's highway and road system, ports, airports and ferry terminals, transit and intercity bus terminals, and railroad network and train stations are important assets to our future. Together with cars, trucks, buses, ships, ferries, trains and planes, the transportation system enables people to reach their desired destination, and products to reach their intended customers.

The people who use Washington's highways, railways, waterways and air space live, work, visit friends, shop or do business in Washington, and each year there are more of us than ever before. As the state's population grows and more businesses open their doors, a greater number of trips are made and more miles are traveled on the system.

The Trends Analysis examines the forces that influence travel growth in Washington to better understand our common past and prepare for our common future in transportation. The trends are based on historical data and observation. The purpose of the report is to provide a basis for long-term investment decisions affecting Washington's transportation future. It is a resource document intended to serve our customers, i.e., our transportation partners in the public and private sectors, transportation planners and providers, and individuals interested in transportation issues, as well as our internal customers at WSDOT.

Executive Summary

The Trends Analysis examines those factors that play a part in influencing travel. The report presents these factors as "forces" influencing travel behavior. The demographic factors considered are a growing population, the aging of the population, and the growth of the labor force. The role of a growing economy and the effect of employment growth and personal income on travel behavior are also examined. Consideration is also given to an important factor in studying urban travel, and that is the dispersion of population and employment locations. With respect to the transportation system, several factors influence travel. These are the aging of the system, travel growth, safety, the movement of freight and goods and concern for the environment.

The key trends found in the report are summarized below.

1 Demographics

1-1 Growing Population

- **Washington's population will increase 36.5 percent from 1997 to 2020.** The state's population in 1997 was 5.6 million. The population is expected to increase 2.0 million to reach 7.6 million by 2020. Net in-migration will result in more than half the population growth by 2020.
- **The largest share of the total population growth will take place in the Central Puget Sound Region.** In 1997, 51 percent of the population will be concentrated in Snohomish, Pierce and King counties. By 2020, these counties will account for about 50 percent of the state's total population or 3.8 million. The fourth highest concentration is expected to be in Spokane county with a population of over half million by 2020.

1-2 Aging Population

- **An important demographic factor in the coming decades will be the aging of the population.** Beginning 2005, those entering the age group 45 to 65 plus years will comprise 37 percent of the population. In the period 2010-20, this age group will comprise 40 percent of the total population.

1-3 Growing Economy

- **Washington's labor force will gain an additional 1.0 million people by 2020.** The total workforce will be 4 million. The growth in labor force from 1997 to 2020 will average 1.3 percent annually. Female labor force participation is a significant factor in this growth accounting for nearly half the labor force. An additional phenomenon will be the slowing down of the labor force participation rate when a large portion of the state population shifts into retirement age.
- **More women are entering the workforce.** The increase in female labor force participation is a significant labor market phenomenon. Women's share of driver licenses was 45 percent in 1970. This share was 49 percent in 1996. By 2001, the proportion of women and men drivers will be about equal.
- **Over a million jobs will be added to Washington's economy by 2020.** The past 25 years from 1970 to 1995 has seen a doubling in employment from 1.3 million to over 2.6 million jobs. Another 1.1 million jobs from 1995 to 2020 are expected bringing total employment in the state to 3.7 million by 2020. The economy will also stabilize and become increasingly diversified.

- **Total personal income will increase faster than national averages.** Washington's share of the nation's total personal income was 1.7 percent in 1970. In 1995, Washington's share accounted for 2.1 percent . By 2020, Washington's share will be about 2.5 percent of the nation's total personal income. Per capita personal income will rise about 40 percent from $21,801 in 1995 to $31,127 by 2020. The 2020 forecast is over 3 percent higher than the national average.
- **Services and trade will lead in employment growth.** By 2020, services and trade will account for 55 percent of the total jobs in the state, and 62 percent of the total job increase. Export oriented services are an important part of the services industry where strong growth is expected in business services, legal services, engineering, management and accounting services.
- **Goods-producing sectors will show faster employment growth than the nation as a whole.** The outlook for aerospace, machinery and instrument production in the state is bright and growth is expected to increase 37 percent from 1995 to 2020. This sector will account for 17 percent of the total jobs in the state.

1-4 Land Use

- **The dispersion of population and employment locations will occur more slowly.** Land use trends have tended to spread uses out which is a pattern linked to greater auto use. One result has been an increase in average trip distances from 8.7 miles in 1983 to 9.5 miles in 1990.[1] However, average trip lengths will begin to taper off as congestion and the amount of time spent driving becomes a constraining factor. In this way, attention will continue to focus on the importance of the suburbs as locations of population and employment growth.

1. National Personal Transportation Survey, U.S. Department of Transportation, 1993, p 4-98.

2 State's Transportation System (State Highways)

2-1 Aging System

- **Maintenance and preservation keeps pace with the aging of the transportation infrastructure.** Since 1969, the number of roadways rated "good" increased from 7,200 lane miles to 11,610 miles. During this time, 1,075 miles of pavement rated "very poor" were repaired bringing the total down from 1,315 miles of "very poor" roads to just 240 miles in 1997. During the next 14 years, the pavement program will work towards maximizing the benefit attained from making repairs before deterioration makes the repairs more costly. The average age of Washington's 2,917 bridges is 34 years. The number of bridges rated "poor" decreased from 208 to 148 from 1984 to 1997.

2-2 Travel Growth

- **More miles are being driven on the highway system than ever before.** From 1970 to 1995, the number of miles driven on the state's highways rose from 11.4 billion miles per year to 27.6 billion miles. The trend will slow down slightly but by 2020, 48.5 billion miles will be traveled on the state's system each year. This is a 79 percent growth in travel from 1995 to 2020.
- **The number of miles traveled by each person is steadily rising.** The average number of miles traveled per capita on all roadways in 1970 was 5,991 miles. By 1990, this figure rose to 9,027 miles. By 2020, miles traveled per capita are expected to peak at 10,448 miles. Female workforce participation will be about equal to men, and congestion levels will influence the amount of time spent in cars. The growth in trip distances may start to slow down due to similar constraints such as congestion and available time.

- **Fewer new miles of roadway are expected.** Centerline miles of highway have remained fairly constant at around 7,000 miles over the period from 1980 to 1997, and is expected to remain close to that level. However, additional lanes have been added to the existing highway system. A total of 497 lane miles were added from 1990 to 1997 to increase roadway capacity. Such improvements are an important element in providing mobility in metropolitan areas.
- **Congestion will increase and become longer in duration.** Congestion has been increasing in metropolitan areas and suburbs throughout the state. No evidence suggests that peak demand periods will diminish in future years. The growth in travel will translate more directly to spreading the peak demand periods in the morning and afternoon. Operating speeds will also be slower on an increasing number of roadway segments.
- **Statewide, 92 percent of all trips were made using the automobile.** The automobile is the dominant mode of travel. This trend is expected to continue to 2020. Transit share has declined to about 2.1 percent in 1995 from 2.2 percent in 1990. The ferry system captured 0.34 percent of the total trips made in 1995. Passenger rail captured 0.01 percent in 1995, and may capture a slightly larger share when commuter rail is introduced. The trends in modal choices are associated with the continued suburbanization of metropolitan areas.

2-3 Travel Safety

- **Highway safety will continue to make Washington roadways safer for travelers.** The number of fatalities on all Washington roadways went down 27.7 percent in the period from 1980 to 1996. During this time, there was an annual decline of 2.0 percent overall from 927 fatalities in 1980 to 712 in 1996. The fatality rate also dropped, from 3.43 fatalities per million miles traveled in 1980, to 1.45 fatalities per million miles in 1996. The *number* of injuries increased 2.0 percent

annually during this period, but considering the miles traveled on the roadway system, the injury rate per million miles actually fell from 2.1 to 1.7 injuries per million miles of travel. Non-fatal accident rates also declined from 3.93 non-fatal accidents per million miles in 1980 to 2.83 in 1996. This positive trend is due to a combination of factors including stricter enforcement of drunk driving laws, greater seat belt use, safer vehicles, and improvements in design of roadside features such as guardrails and sign supports.

- **Fatalities from truck collisions are relatively few.** There were 51 fatal accidents involving large trucks in 1992. The number of fatalities increased slightly to 63 by 1995. Injuries rose slightly from 44.2 injuries per 100 million miles traveled by trucks to 51.7 injuries per 100 million miles in this period. Although fatalities and injuries from truck collisions are low compared to all other roadway collisions, the challenge is to continue lowering these rates even as both trucks and passenger vehicles increase their use of the system.
- **Fewer aircraft fatalities are expected.** Aircraft fatalities decreased from 46 in 1985 to 17 in 1997. The number of injuries increased from 14 in 1985 to 46 in 1997. The reason for fewer fatalities is not known, but may be due to several reasons: 1) tighter controls on airspace; 2) more pilot training; 3) occasional pilots not flying; and 4) stricter FAA controls on aircraft replacement and parts.
- **Bicyclist fatalities are expected to remain low but injuries are increasing.** Bicyclists accounted for 12 fatalities in 1988 and 14 in 1996. The fatality rate in 1995 was 7.9 fatalities per 100 million miles of bicycle travel. The total number of injuries was 1,617 injuries in 1995, or an injury rate of 9.8 per one million miles of bicycle travel.

2-4 Freight and Goods

- **The movement of freight and goods will play an increasingly larger role in metropolitan areas.** The level of economic activity and the level of goods movement in an area are related. Freight and goods travel along north-south and east-west trade corridors of the state following highways, railways, and waterways. These movements supply metropolitan areas and also carry goods through the state as exports and imports. Port container cargo alone is forecast to grow from 1.2 million containers in 1990 to 3.2 million containers by 2015. The impact on landside traffic from rail and truck activity generated by the ports, as well as truck and rail activity serving the metropolitan areas themselves will pose a challenge to the flow of passengers.
- **The globalization of markets will have a significant impact on freight and goods movement in metropolitan areas.** Exports and imports through the ports will nearly double between 1995 and 2015. In 1995, 2.5 million metric tons were handled at the ports. By 2015, this figure will increase to 4.6 million metric tons. An era of free trade agreements will also have a major impact on international freight movement in metropolitan areas.

2-5 Environmental Conditions

- **Carbon dioxide emissions from transportation are expected to increase 1.3 percent annually through 2010.** Carbon dioxide is the predominant greenhouse gas released, accounting for 85 percent of total emissions weighted by global warming potential. Despite significant energy efficiency improvements, transportation activity outpaced efficiency gains. This resulted in increasing energy use and carbon dioxide emissions. Gasoline contributed more than 60 percent of the carbon dioxide emissions from transportation.

- **Smog in urban areas is on the way down.** Carbon monoxide and nitrogen oxide are two of six air pollutants for which the EPA set primary air quality standards. These two pollutants contribute to the formation of ground level ozone present in smog. Total carbon monoxide emissions dropped 19 percent between 1985 and 1995. Nitrogen oxide emissions dropped 4.2 percent for passenger vehicles, but off-highway sources (railroads, marine vessels and aircraft) rose by 40.2 percent.

- **Ratification of an agreement on greenhouse gas emissions will spur changes in the form of transportation.** The function of transportation will remain the same, namely, to accommodate the efficient movement of people and goods. Its form may evolve due to technology advancements that will look toward hybrid vehicles that reduce carbon dioxide emissions through the tailpipe.

3 Transportation Technology

3-1 Intelligent Transportation Systems (ITS)

- **ITS is intended to make more efficient use of existing highways and space limitations.** The rationale behind ITS is to limit construction, environmental and property rights damage caused by expanding highways. ITS applies communications, computer and information systems to surface transportation. ITS applications include real-time traffic information delivered on the Internet, road weather information systems, ramp meters, highway advisory radio and variable message signs along highways.

3-2 Hybrid Automobiles

- **Hybrid Electric Vehicles (HEVs) may be an alternative to the conventional automobile.** An HEV is an electric car and a small internal combustion engine and electric generator on board to charge batteries. HEVs would be able to achieve several times the fuel efficiency of a gasoline-powered vehicle. They are also considered relatively less polluting.
-

This report is organized by the factors described above. The data are from national and state sources. The report is presently available on Washington's Transportation Plan homepage at www/wsdot.wa.gov/wtp/